

The liquid in contact with a growing crystal of sodium nitrate has at 19° C. the index 1·38991, and contains about 48·45 grammes of salt in 100 grammes of solution; a saturated solution at 19° C. has the index 1·38905, and contains about 48·1 grammes of salt in 100 grammes of solution.

In each case the liquid in contact with the growing crystal is slightly supersaturated. It was not found to exhibit double refraction even in the case of sodium nitrate. No experiments seem to have previously been made upon the nature of this liquid.

G. Wulff has suggested that vicinal faces are due to concentration streams in the solution. In order to test this view, crystals of alum were measured after growing for several hours in solution kept continually agitated in order to eliminate the action of the concentration streams. Almost no effect was produced upon the angles of the vicinal faces.

In sodium chlorate and sodium nitrate the solute is about 45 times more dense in the crystal than in the adjacent liquid. Now planes with high indices in a space-lattice contain fewer points in unit area than planes with simple indices. The author suggests that vicinal faces grow upon a crystal in preference to simple forms because the crystallising material descends upon the growing face in a shower which is not very dense.

“On the Dependence of the Refractive Index of Gases on Temperature.” By GEORGE W. WALKER, M.A., Fellow of Trinity College, Cambridge. Communicated by Professor J. J. THOMSON, F.R.S. Received February 26,—Read March 26, 1903.

(Abstract.)

The investigations of Professor Mascart on this subject are perhaps the most extensive of any up to the present time. He examined the effect in several gases, and found that in general the temperature coefficient exceeded the theoretical coefficient given by Gladstone and Dale's law. The range of temperature was, however, comparatively small, and his results for air do not agree with those of Lorenz, von Lange, and Benoît. In fact these four observers disagree. Lorenz and Benoît found a coefficient agreeing with the above law, while von Lange obtained a coefficient less than the theoretical value.

A repetition of the measurements therefore seemed desirable. The gases examined were air, hydrogen, carbon dioxide, ammonia, and sulphur dioxide. The range of temperature was from 10° C. to

100° C. The method used was the well-known one of Jamin, but special precautions were taken to obtain accuracy, and to be sure that the gas had not changed in composition during the various changes of pressure and temperature to which the containing tubes were subjected. An accuracy of about one part in 600 has been obtained.

The results are briefly shown in the following table, and it will be observed that the temperature coefficients obtained are substantially less than those obtained by Mascart.

Absolute Value of  $\mu$  for the D line at 760 mm, and 0° C.

| Observer.     | Air.            | Hydrogen.        | Carbon dioxide. | Ammonia.        | Sulphur dioxide. |
|---------------|-----------------|------------------|-----------------|-----------------|------------------|
| Mascart.....  | 1·0002927       | 1·000139         | 1·000454        | 1·000379        | 1·0007038        |
| Lorenz.....   | —               | 1·000139         | —               | 1·000373        | —                |
| Ketteler..... | —               | 1·000143         | 1·000449        | —               | 1·000686         |
| Dulong.....   | 1·000294        | 1·000138         | 1·000449        | 1·000385        | 1·000665         |
| Walker.....   | 1·0002928<br>±3 | 1·0001407<br>±15 | 1·0004510<br>±5 | 1·0003793<br>±5 | 1·0006758<br>±4  |

Temperature Coefficients of Refractive Index.

|                            | Air.          | Hydrogen.     | Carbon dioxide. | Ammonia.      | Sulphur dioxide. |
|----------------------------|---------------|---------------|-----------------|---------------|------------------|
| Coeffi. of vol. expansion. | 0·00367       | 0·00366       | 0·00371         | 0·00382?      | 0·00390          |
| Mascart .....              | 0·00382       | 0·00378       | 0·00406         | —             | 0·00460          |
| Walker.....                | 0·00360<br>±3 | 0·00350<br>±3 | 0·00380<br>±3   | 0·00390<br>±3 | 0·00416<br>±2    |